Oscar the Owl, mascot for an O*NET-based product, knows all about a new source for occupational information. You should, too.

O*NET

The Occupational Information Network™

Oscar the Owl appears in this issue of the *OOQ* courtesy of the Texas State Occupational Information Coordinating Committee.

Replace with a database: O*NET replaces the Dictionary of Occupational Titles

by Matthew Mariani

What does it take to get a job done? It depends on the job. But a new database may have the answers. It helps workers identify the skills and knowledge they need to succeed.

What it takes to perform an occupation changes at the speedy pace set by new technologies. Identifying necessary skills depends on a flow of information concerning the work, the workers, and the workplace. Ensuring that workers gain desired skills may require the average worker, the employer, and the instructional designer to speak to each other using a new, shared language. That language is O*NET.

O*NET, the Occupational Information Network, is replacing the *Dictionary of Occupational Titles* (DOT) as a source of occupational information. O*NET is a database—not a book, like the DOT. This database has the qualities of both an interactive library and a language.

Serving as a library for information on the working world, O*NET allows everyone to access data on job characteristics and worker attributes. It includes information on the knowledge, skills, abilities, interests, preparation, contexts, and tasks associated with 1,122 O*NET occupations.

Like a spoken language, O*NET acts as a medium for exchanging information. Workers benefit by exploring career options and learning which skills employers seek for specific types of work. Employers identify necessary skills to increase the efficiency of recruitment and training. Educational planners need O*NET to design instructional programs that teach the skills demanded in the workplace.

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O*NET has an organizing structure and a distinct vocabulary. An overview of the birth of O*NET precedes a more detailed look at its structure and content. Discussion of software applications that build upon O*NET follows. A final section tells how to obtain O*NET products. The table on page 4 and the diagram on page 5 highlight key points, and the sidebar starting on page 6 gives details on O*NET skills.

Why O*NET?

The *Dictionary of Occupational Titles*, first published in 1938, emerged in an industrial economy and emphasized blue-collar jobs. Updated periodically, the DOT provided useful occupational information for many years. But its usefulness waned as the economy shifted toward information and services and away from heavy industry. The need for occupational information that is more relevant to the modern workplace spurred the creation of O*NET.

During the mid 1990s, a team of public and private sector organizations, led by the U.S. Department of Labor's Employment and Training Administration, created O*NET. The Employment and Training Administration released a preliminary version of O*NET on a limited basis in December 1997. It made a refined O*NET 98 available to the general public in December 1998.

Although currently in use, O*NET has a lot of growing to do. It now contains data adapted from pre-existing sources, such as the *Dictionary of Occupational Titles.* In addition, many occupational variables in O*NET 98 rely on ratings assigned by occupational experts, rather than survey data. To describe current occupations accurately, O*NET must include new data obtained from employers and workers. Data collection may begin as early as 1999, using a specially designed survey. In 2001,

DOT and O*NET: How they compare

Dictionary of Occupational Titles (DOT)	Occupational Information Network (O*NET)
Book	Database
Fixed format	Flexible system, allowing users to reconfigure data to meet their needs
Reflected an industrial economy and the predominance of blue-collar workers	Reflects the occupations of today's labor market and the need for multiskilled workers
Task based: described workers' functions in relation to data, people, and things	Skills based: describes job requirements and worker attributes, as well as content and context of work, using 483 variables
Offered isolated dictionary definitions of occupations	Offers new means of identifying and describing occupations, using a classification system linked to labor market information
Required complex crosswalks to other systems	Uses standard occupational coding system, easing direct links to other systems
Provided no measure of the transferability of skills, making it difficult to create job clusters or explore career paths	Gauges the transferability of skills, making it easy to create job clusters and explore career paths across clusters
Difficult to update	Easy to update

these new data are scheduled to appear in the comprehensive O*NET database, and the occupations will be realigned according to the revised Standard Occupational Classification system.

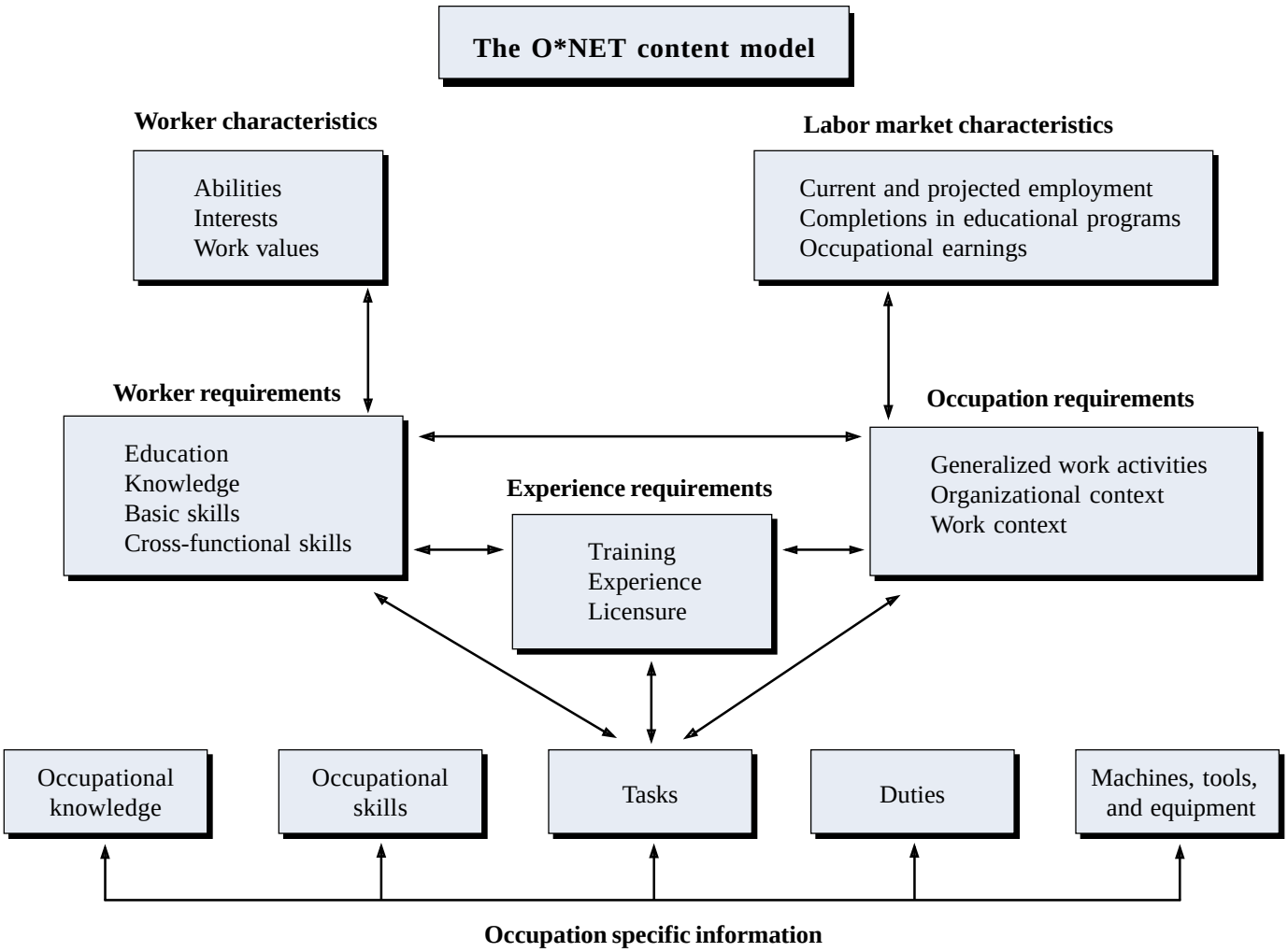
O*NET will improve upon the DOT in many ways. O*NET focuses on transferable skills, making it easy to group jobs into related clusters and explore career paths across clusters. The new database also uses a standard occupational classification system directly linked to the labor market data that are vital to making informed employment decisions. Using the standard classification will ease links between O*NET and other sources of occupational information, such as the *Occupational Outlook Handbook*. In addition, O*NET identifies knowledge and specific instructional programs required for occupations, thereby stressing the connection between school and work. Besides providing for rapid updating of information, a database allows users to rearrange data according to their needs.

*Built-in O*NET viewer software allows users to look at concise occupational profiles, describing the most important characteristics of an occupation.*

The benefits of O*NET should make it an effective tool for negotiating today's changing labor market. Driven by skills rather than tasks, O*NET provides information on fewer occupations than the DOT—1,122 compared to 12,741. However, many of the detailed occupations in the DOT no longer exist, and many more employ very few people. O*NET does not describe obscure DOT occupations, such as chick grader or alarm mechanism adjuster. Instead, O*NET provides more information on the significant occupations it covers. More importantly, the information has more value to users.

Content here, content there

O*NET contains much more information than the average student or worker wants. Luckily, the built-in O*NET viewer software allows users to look at concise occupational profiles. Each profile describes the most important characteristics of an occupation. The software also lets users access the entire database. For each occupation, the O*NET 98 database offers ratings for 483 different variables. Crosswalks relate O*NET occupations to occupations defined in other systems, including the DOT. O*NET information is organized according to a content model made up of six domains. (See diagram.) Each domain is de-



scribed below, with the occupation of geographer included to illustrate.

Worker characteristics. The abilities, interests, and work values associated with workers in different occupations make up this domain. The occupational profile for geographers, for example, identifies five abilities as most important: Oral expression, written expression, written comprehension, oral comprehension, and spatial orientation. The profile includes a brief definition of each ability.

Digging further into the details for geographers reveals 2 numeric ratings for each of 52 O*NET abilities. One rating indicates the level of each ability geographers need, and the other gauges the importance of that ability in performing the work. For geographers, on a scale of 1 to 100, written expression has a level rating of 66 and an importance rating of 75. Each O*NET occupation has comparable ratings for each ability.

Each occupation also has special ratings for interests and work values. O*NET provides occupational interest profiles compatible with the John Holland model of personality types and work environments. Six interest categories include: Realistic, investigative, artistic, social, enterprising, and conventional. The O*NET occupational profiles identify one or two of the most relevant codes for each occupation. For example, the profile for geographers displays the definitions for investigative and realistic. In addition, each occupational profile displays one or two of the highest rated of O*NET's six work values. The profile for geographers lists independence and achievement.

A skill based system

A task is something a worker does, and a skill is something a worker needs to do a task. Both the *Dictionary of Occupational Titles* and the O*NET replacing it include information on specific tasks associated with many occupations. But unlike the DOT, O*NET also stresses skills. This gives O*NET more flexibility as a tool for career exploration and planning. O*NET skills fit into seven groups, which belong to two broader categories as follows:

Basic Skills

Content skills—background skills that are needed to work with and acquire more specific skills in a variety of domains.

- Reading comprehension
- Active listening
- Writing
- Speaking
- Mathematics
- Science

Process skills—procedures that contribute to more rapid acquisition of knowledge and skill across a variety of domains.

- Critical thinking
- Active learning
- Learning strategies
- Monitoring

Transferable skills

Social skills—working with people to achieve goals.

- Social perceptiveness
- Coordination
- Persuasion
- Negotiation
- Instructing
- Service orientation

Continued ▶

Worker requirements. These include education, knowledge, basic skills, and cross-functional skills. These elements share one characteristic: They are all directly amenable to change through new learning and experience.

In this domain, O*NET defines educational requirements by citing instructional programs required to perform in an occupation. It also specifies the general areas of knowledge required. The occupational profile for geographers, for example, briefly describes an instructional program in geography. It also defines the most essential types of knowledge required for this occupation: Geography, sociology and anthropology, biology, and physics.

*O*NET's experience requirements and worker requirements both address education, but they do so in different ways.*

O*NET rates each occupation on 46 skills according to the level of skill required and its importance in doing the work. The skills include both basic and cross-functional, or transferable, skills. Examples of basic skills are reading comprehension, mathematics, and critical thinking. Examples of cross-functional skills are negotiation, troubleshooting, and time management. (See the sidebar, "A Skill Based System," for more detail on skills.)

Occupation requirements. O*NET stores information on generalized work activities and will eventually include more information on organizational and work contexts in the occupation requirements domain. Generalized work activities are generic tasks or job behaviors that apply across occupations. O*NET rates each occupation on 42 generalized work activities according to level, importance, and frequency. The top four work activities for geographers as they appear in the occupational profile are:

- Getting information needed to do the job—Observing, receiving, and otherwise obtaining information from all relevant sources.
- Documenting and recording information—Entering, transcribing, recording, storing, or maintaining information either in written form or by electronic means.
- Processing information—Compiling, coding, categorizing, calculating, tabulating, auditing, verifying, or processing information or data.
- Estimating needed characteristics—Estimating the characteristics of materials, products, events, or information; esti-

mating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.

Information on organizational context does not appear in O*NET 98. It will be included in the comprehensive O*NET 2001 database. Organizational context will cover 51 organizational characteristics affecting how people do their work, including information on employee empowerment, team structure, and decentralization. O*NET 98 offers some information on work context. The 2001 database will include 46 physical and social factors influencing the nature of work, such as pace and scheduling, work attire, and environmental conditions, including job hazards.

Experience requirements. Experience requirements involve preparation and licensure requirements. O*NET 98 assigns each occupation to one of five job zones. Job zones indicate the amount of experience, education, and training a worker usually needs to perform in an occupation. The purpose of the 5 job zones thus resembles that of the 11 education and training categories used by the Bureau of Labor Statistics. (See "A New Way to Classify Occupations by Education and Training" in the Winter 1995-96 issue of *OOQ*.)

Each O*NET occupational profile specifies a job zone with three separate statements describing the experience, education, and job training needed (including apprenticeship training, if applicable), plus examples. Geographers belong to job zone four, defined as follows:

- *Overall experience*—A minimum of 2 to 4 years of work-related skill, knowledge, or experience is needed for these occupations.
- *Education*—Most of these occupations require a bachelor's degree, but some do not.
- *Job training*—Employees in these occupations usually need several years of work-related experience, on-the-job training, or vocational training.
- *Examples*—Many occupations in job zone four involve coordinating, supervising, managing, or training others. Examples include accountants, chefs and head cooks, computer programmers, historians, pharmacists, and police detectives.

Both experience requirements and worker requirements address education, but they do so in different ways. The education statements in the experience requirements domain cite an educational level, whereas the worker requirements domain notes a standard type of instructional program.

The information on licensure requirements for occupations will not appear in the O*NET database. In the future, O*NET may link to other databases with State-specific information on licensure.

Complex problem solving skills—solving problems in real world settings.

- Problem identification
- Information gathering
- Information organization
- Synthesis/reorganization
- Idea generation
- Idea evaluation
- Implementation planning
- Solution appraisal

Technical skills—designing, setting up, operating, and correcting malfunctions involving machines and technological systems.

- Operations analysis
- Technology design
- Equipment selection
- Installation
- Programming
- Testing
- Operation monitoring
- Operation and control
- Product inspection
- Equipment maintenance
- Troubleshooting
- Repairing

Systems skills—understanding, monitoring, and improving organizations and systems.

- Visioning
- Systems perception
- Identifying downstream consequences
- Identification of key causes
- Judgment and decisionmaking
- Systems evaluation

Resource management skills—allocating resources efficiently, including finances, materials, and human resources.

- Time management
- Management of financial resources
- Management of material resources
- Management of personnel resources

Labor market characteristics. Employment projections and earnings data on O*NET occupations belong to this domain. O*NET 98 includes national occupational employment projections from the Bureau of Labor Statistics. Wage data come from the Occupational Employment Survey and the Current Population Survey. O*NET 2001 will also be able to link to other databases, allowing access to regional and local data.

Occupation specific information. This domain stands apart from the others by providing information specific to each occupation. The previous domains describe specific occupations by assigning unique ratings, but the variables are identical for every occupation. These common variables are the vocabulary that makes O*NET a common language for everyone who works, hires workers, or designs training programs. But like a spoken language, O*NET enables communication via the distinctions it makes. And to distinguish between 1,122 occupations, O*NET must account for information peculiar to individual occupations. The occupation specific domain does just that.

*Add-on products will unleash the full power of the O*NET database to meet the needs of different users.*

O*NET will eventually contain five types of occupation specific information: Occupational knowledge, occupational skills, tasks, duties, and machines, tools, and equipment used. O*NET 98 focuses on occupation specific tasks. For example, the occupational profile for geographers lists items such as:

- Collects data on physical characteristics of specified area, such as geological formation, climate, and vegetation, using surveying or meteorological equipment.
- Studies population characteristics within an area, such as ethnic distribution and economic activity.
- Constructs and interprets maps, graphs, and diagrams.

O*NET unleashed

Brief occupational profiles and crosswalks make O*NET useful to anyone exploring occupations. But O*NET also creates a foundation on top of which developers may build add-on software applications for many work-related purposes. Instead of accessing data via the built-in O*NET viewer, most future users will see O*NET data repackaged in privately and publicly developed add-on software programs.

Private organizations and public agencies have already begun developing applications based on the O*NET. Two examples—CareerZone, focusing on school-to-work activities, and the Occupation and Skill Computer-Assisted Researcher (OSCAR), for career changers—are described below. Add-on products like these will unleash the full power of the O*NET database. They will arrange and present O*NET data to meet the varying needs of different users, including students, workers, counselors, job developers, instructional designers, personnel managers, and others. Software developers will create applications to do things such as:

- Create occupational clusters based on skills, knowledge, and job tasks
- Improve career counseling tools
- Streamline vocational counseling
- Aid in exploring career options that capitalize on prior experience
- Ease job search and reduce job search costs
- Fine tune assessments for evaluating needed job skills
- Align educational and job training curricula with current workplace needs
- Develop resumes, job orders, and position descriptions
- Allow for better hiring decisions.

CareerZone. The New York State Department of Labor has released a new career information system called CareerZone to over 600 schools in the State. This system offers a kid-friendly version of the occupational profiles available through the O*NET viewer. Conceived as a tool for school-to-work pro-

grams, CareerZone lets students explore occupations in three ways: They can search by occupational title, use a built-in assessment to generate a list of occupations based on interests, or select one of six occupational clusters defined by O*NET data.

Like most add-on applications, CareerZone provides additional resources, besides extracting key O*NET data and presenting it in a certain format. For example, CareerZone offers 60-second video clips to introduce several O*NET occupations. The system is also designed to link information on additional skill standards from the National Skills Standards Board and on schools offering specific instructional programs. An Internet version of CareerZone is scheduled to come online before the year 2000.

OSCAR. The Texas State Occupational Information Coordinating Committee has introduced OSCAR to working Texans. This career exploration software adapts O*NET for career changers, displaying complex data in a simple format. If necessary, beginning users may click on an image of the system mascot, Oscar the Owl, for help navigating the system. Like CareerZone, OSCAR includes State specific labor market information.

Career changers find OSCAR helpful because it takes advantage of O*NET's emphasis on transferable skills. OSCAR allows users to search for occupations based on O*NET skills, knowledge, abilities, work values, education and training levels, and generalized work activities. It helps career changers find alternative occupations—occupations with ratings on O*NET variables similar to those of their current or previous occupations. OSCAR then shows how users' old and potential new occupations compare on each variable. The system even generates a career development summary highlighting differences to identify areas that may need improvement.

OSCAR includes detailed Texas labor market data, including earnings, job outlook, annual job openings, numbers of applicants, turnover, and industry employment patterns. For each occupation, it also indicates women and minority representation, average worker tenure, and average worker age.

Getting O*NET

The O*NET 98 database and its viewer software are currently available, along with a user guide and a data dictionary of interest to software developers. O*NET and related products are sold by the U.S. Government Printing Office. Call (202) 512-1800 for price and ordering information. The O*NET 98 database, its viewer software, the user guide, and the data dictionary may also be downloaded free via the Internet. To find out more, visit the O*NET home page at **www.doleta.gov/programs/onet/**